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## OWNERSHIP OF GENETIC MATERIAL AND INFORMATION

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**Abstract**—As a result of the International Human Genome Project genetic information is rapidly multiplying. To avoid some of the problems regarding the availability and use of genetic information, it is sometimes suggested to apply the concept of *ownership*. This article focuses on the clarification of the status of genetic material and genetic information, obtained as a result of screening and counseling of individual patients. First, some philosophical theories of ownership are examined for a justification of the use of the concept of ownership with regard to the human body. Next, arguments with regard to ownership of the human body are examined. The results of this analysis are applied to genetic material and genetic information. © 1997 Elsevier Science Ltd

*Key words*—ownership, property, genetic material, genetic information

### INTRODUCTION

The Human Genome Project generates an enormous amount of genetic information. This information will increase knowledge of our biological functioning, and lead to new opportunities for diagnosing, preventing, and treating a variety of human diseases. Concern has been expressed regarding the responsible use and control of the information and possibilities that will flow from our increasing knowledge of the human genome. To avoid some of the problems regarding the availability of genetic information, it is suggested that we employ the concept of “ownership” (or “property”).

Genetic information is generated on two different levels. One level concerns the information that is expected to result from the dual process of mapping and sequencing the entire human genome. The other level concerns the specific information obtained as a result of screening and counseling of individual patients. Another distinction that seems useful is the distinction between genetic material and genetic information. It is not immediately clear whether the moral status of genetic material is the same as the moral status of genetic information.

This article focuses on the clarification of the status of genetic material and genetic information, obtained as a result of screening and counseling of individual patients, through a preliminary philosophical analysis of the relation between the concepts of property and human body. Is it possible to construct a line of reasoning from ownership of the human body to ownership of its parts when separated from the body, including genetic material?

Next, is it possible to claim ownership of one's genetic information if one would be considered the owner of one's genetic material?

The possible ownership of the human body (parts) will be analysed from two different perspectives. First, leading philosophical theories of ownership will be examined. Second, the relationship between the human body (parts) and individual characteristics of ownership will be examined.

### OWNERSHIP IN MEDICINE AND GENETICS

The growing importance of the moral principle of respect for individual autonomy in health care ethics is apparently associated with popularity of the image of the body as property (Campbell, 1992). If the individual person is regarded as autonomous subject, then the body is his private property; the person is the sovereign authority with property rights over his or her body. Since autonomous individuals own their bodies, they have exclusive possession of it and they alone have it at their disposal. They can bequeath their body to an anatomical institute, donate body parts for transplantation purposes, or sell body materials on a commercial market. Bodies and body parts can be acquired and manipulated by others, but only following explicit permission from the owners.

Property language in health care ethics is used to designate the locus of decision making authority: the individual as owner is in control over his own body. In view of the increasing medical possibilities to invade the human body as well as the potential of body parts for research and commercial purposes, it is necessary to protect the individual person against harmful and paternalistic interventions

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with and into his body. At the same time, the concept of body ownership is morally problematic. The distinction between person and body is contrary to the existential identity with our bodies and the self-experience of ourselves as embodied selves.

The concept of ownership is recently introduced in ethical debates in medical genetics (Danish Council of Ethics, 1994; Pompidou, 1995). The major issue here is the question of patentability of human genes. The growing commercial potential of genes and their nucleotide sequences has led to controversies regarding the possible patenting of the human genome (Adler, 1992; Davis, 1993; Eisenberg, 1992; Kiley, 1992; Roberts, 1987). Making the human genome subject to property laws presupposes the relevancy and applicability of the ownership concept in this area. The basic question is: can anyone "own" the human genome? If the answer is positive and the concept of ownership considered useful in regard to genes, further questions have to do with who precisely is the owner. Is it the individual person with a particular genome? Are there rightful property claims of the scientist or company having identified particular genes or nucleotide sequences? Or is the human genome the property of humankind, "the common heritage of humanity", as proclaimed in a recent declaration of UNESCO (1995)?

In order to determine the relevancy and possible uses of the ownership concept in the area of human genetics, we need a conceptual analysis and critical examination of the theoretical implications of the concept.

### THEORIES OF OWNERSHIP OR PROPERTY

In this section theories of ownership will be discussed, but it is not an exhaustive analysis of all possible theories of ownership. The purpose of this review is to clarify what these theories try to explain, to examine whether ownership of the body is included in any of the theories, and, if ownership of the body is not included, whether something can be said of the status of the human body. The theories outlined include: John Locke's (he was the first philosopher to argue for ownership of the body); the argument from utility by Bentham; Kant's theory of ownership, from which he explicitly excludes the human body; and the theory of Nozick (he elaborates on Locke's theory, but without imposing restrictions on the use of one's own body).

#### *John Locke's theory of ownership*

Locke intends to provide a justification for private ownership in a situation where there is as yet no private ownership of things (especially land). In the State of Nature, land and all that is on it is common to all men. God has given the land to all mankind, but with the command to labour, to culti-

vate the land. The problem is how to justify private ownership of part of the land that is common to all. Locke argues that since man has a property in his own person he has a property in his own labor. By mixing his labor with something (for example, by working on the land) he becomes the owner of the thing. There are, however, two restrictions. A person can only appropriate a piece of land, as long as there is "enough and as good" left for others to appropriate. The second restriction is the "spoilage" limitation. I remain the owner as long as there is no spoilage of goods (for example spoilage of vegetables, because there is too much for me; or, the piece of land is too large for me to be able to do all the work) (Locke, 1978). This approach seems attractive, but several philosophers have shown that the argument fails (Carter, 1989; Day, 1966; Grunebaum, 1987).

Locke's approach is interesting with regard to ownership of the human genome because he is the first philosopher to mention ownership of the human body. In *The Second Treatise on Government* there is a famous passage:

Though the earth, and all inferior creatures be common to all men, yet every man has a *property* in his own *person*. This nobody has any right to but himself. The *labour* of his body, and the *work* of his hands, we may say, are properly his. Whatsoever then he removes out of the state that Nature hath provided, and left it in, he hath mixed his *labour* with, and joined to it something that is his own, and thereby makes it his *property* (Locke, 1978 §27, p.130).

And in the same book:

From all which it is evident, that though the things of Nature are given in common, man (by being master of himself, and *proprietor of his own person*, and the actions or *labour* of it) has still in himself the great foundation of property;... (Locke, 1978 §44, p.158).

Therefore, man is the owner of his person (and so of his body). The ownership of the body of the person is a precondition to acquire ownership of unowned things in the State of Nature. Locke, however, provides no further arguments for this ownership of one's person.

What does ownership of the *body* imply? Can a person do anything he wants with himself? No, he cannot. According to Locke, suicide and selling oneself into slavery are prohibited, because man has no power over his own life. Man is also not the absolute owner of himself. Man is the property of God, because God is the maker of man.

#### *Bentham's theory of ownership*

Jeremy Bentham's theory of ownership reflects a *utilitarian* foundation of property rights. The starting point for his deliberations is the principle of utility. Following this principle, every action is judged according to the extent in which the action augments happiness and diminishes pain. This assessment applies to actions of individuals as well as to



measures of government. Only the measures of government have to promote the happiness of the community (Bentham, 1970).

Property for Bentham is essentially a creation of the law. There are no "natural rights" on which to found property rights. The creation of property is only justified if it will enlarge the total sum of happiness in society. The arguments for acknowledging property rights is as follows (Macpherson, 1978, pp. 39–58). The state has the task of promoting general happiness. For the promotion of happiness four elements are important: subsistence, abundance, equality, and security. Of these four elements *security* is the most important. First, without security there will be no subsistence and abundance. People have to be sure that they will be able to enjoy the fruits of their labour and that others will not forcefully take their profits away. Otherwise people will have no incentive to work. If they do not work, they will not be able to ensure subsistence and abundance, and as a result happiness will decrease. Second, a characteristic of man is that he can derive pain and pleasure from the anticipation of future events. Expectations are important in planning our (future) lives. One expectation that is important for happiness is the security that what is mine will remain mine. The acknowledgement of property rights will serve this goal.

Bentham's principal point of reference is whether an acknowledgement of property rights will enhance the total happiness of society. If so, property rights should be constructed and created by laws. In his treatment of property, ownership of the body is not mentioned. Bentham seems to reserve the term "property" for things external to the person (Bentham, 1970, pp. 208–209, 243).

### *Kant's theory of ownership*

Immanuel Kant's theory with regard to ownership starts with the general principle of law:

"Any action is *right* if it can coexist with everyone's freedom in accordance with a universal law, or if on its maxim the freedom of choice of each can coexist with everyone's freedom in accordance with a universal law." If then my action or my condition generally can coexist with the freedom of everyone in accordance with a universal law, whoever hinders me in it does me *wrong*; for this hindrance (resistance) cannot coexist with freedom in accordance with a universal law (Kant, 1991, p. 56).

This general principle of law is ultimately derived from the supreme principle of morality, the categorical imperative. One formulation of the categorical imperative is to always treat humanity, in one's own person, as well as in the person of everyone else, as an end in itself, and never as a mere means. On "humanity as an end in itself" is based the innate right to freedom for everybody: the freedom to act as long as one's actions are compatible with the freedom of everybody else according to a general law. If private property is to be possible, it

must be in accordance with the general principle of law.

According to Kant, what is rightfully mine is that with which I am so connected that the use by another person without my consent, would hurt (offend) me. But to be able to use something it must be in my possession. Something outside of me can only be mine if I can be hurt by the unconsented use by another, although this object is not yet in my possession (Kant, 1991, p. 68). For this to be possible it is necessary to discern a special form of possession: intelligible or lawful possession (for example, I can be the owner of a weekend cottage, although I am at this moment not in the cottage, but in my house in the city). Kant, therefore, has to argue for the *rightful* (lawful) possession of external objects. To say that I am the *rightful owner* of an object is to say that someone else interferes with my freedom if he uses the object without my consent. The concept of rightful possession is a concept of freedom. To establish the use of the concept of rightful possession one has to show that it is presupposed by a moral imperative that is derived from the general principle of law. This moral imperative is the "Postulate of Practical Reason with Regard to Rights": it is possible for me to have any external object of my will as mine (my property).

Kant explains his postulate as follows. An object of the will is something I have the physical power to use. If it would not rightfully be within my power (it would be against the general principle of law) to use the object, then freedom would rob itself of its possibility of using the *will* with regard to objects (of the will) by placing these objects outside any possible use. And this in a situation that the *will* to use the object is formally not in defiance of the general principle of law (i.e., the use of the object would be in accord with the freedom of every one). The only laws practical reason formulates are formal rules for the use of the will. Reason says nothing about the objects of the will. This means that an absolute prohibition against the use of an object would be a contradiction of external freedom with itself. From this reasoning follows the *a priori* assumption of *practical reason*: every object of my will is to be treated as having the objective possibility of being mine or yours. That is: everything can be owned. The concept of rightful possession (without physical possession) is intelligible.

In extending the concept of rightful possession to external objects, practical reason formulates a permissive law:

This postulate can be called a permissive principle (*lex permissiva*) of practical reason, which gives us an authorization that could not be got from mere concepts of Right as such, namely to put all others under an obligation, which they would not otherwise have, to refrain from using certain objects of our choice because we have been the first to take them into our possession. Reason wills that this hold as a principle, and it does this as *practical*

reason, which extends itself a priori by this postulate of reason (Kant, 1991, p. 69).

The only place where this right to an external object can be in accord with the freedom of everyone, and where to my right corresponds a duty of others to refrain from using the object, is within civil society.

In this permissive law the concept of first appropriation appears ("the first to take them into our possession"). If every object has the objective possibility to be mine or yours, it must be possible to acquire ownership of unowned things (objects that are not already in someone's possession). An object of my will cannot become mine by just being an object of my will, if the object is already in your possession (your property), because that would be in defiance of the general principle of law. I cannot justifiably trespass on your freedom. Therefore, somewhere there must have been a first acquisition, even before the existence of civil society. This first acquisition is the acquisition of land. The common ownership of the land (the earth) is the precondition for private ownership to become possible. To ensure that others will respect my appropriation, however, it is necessary to enter civil society.

In her discussion of Kant's theory of property, Gregor (1988) explains that to say that something is mine, is to say that my exclusive use of the "object" is in accord with the general principle of law (it is in accord with the freedom of everybody else). To be able to use an object it must be in my possession. Therefore, to call something mine is to say that my possession of it is rightful. The only innate right man has is the right of freedom. In terms of the innate right of freedom, it can now be said that I am in rightful possession of my own person and so of the objects I am holding. But this possession of one's own person is not legal ownership. Discussing the (un)acceptability of organ selling, Chadwick (1989) cites Kant saying that man cannot dispose over himself because he is not a thing. Man is not his own property, because in so far as he is a person, he is a subject, who can be owner of things. The same expression can be found in *The Metaphysics of Morals* where at the end of his discussion of *On Property Right* Kant remarks that a man can be his own master, but cannot be the owner of himself (he can not dispose of himself as he pleases, because he is accountable to mankind in his own person) (Kant, 1991, p. 90).

There are clear restrictions to the way man may treat himself. According to Kant the first obligation of a person concerning himself is his self-preservation. The opposite to self-preservation is the whole or partial destruction of the person. The whole destruction (of the person) occurs by committing suicide; the partial destruction by, for example, removing or ruining parts (like organs). Suicide is prohibited according to Kant, because by

killing oneself morality itself is destroyed. Changing myself by removing an integral part like an organ is something like partial suicide (and, so, probably would not be allowed) (Kant, 1991, pp. 218–220). Finally, in his *Eine Vorlesung über Ethik* Kant says that a human being is not entitled to sell his limbs for money, even if he were offered 10000 thalers for a single finger. Otherwise it would be possible to buy all the limbs of man (Kant, 1990). According to Chadwick (1989), this conclusion is not justified. It is not self-evident that if someone has sold one of his kidneys, he will also want to sell the other one. On the contrary, he will probably be very much concerned for his remaining kidney.

### *Nozick's theory of ownership*

For Nozick, people have certain basic (natural) rights such as the right not to be harmed in life, health and liberty. Part of the right of liberty is the right of property. Nozick's theory of property is an "entitlement theory" and he provides the following inductive definition of the entitlement theory:

- (1) A person who acquires a holding in accordance with the principle of justice in acquisition is entitled to that holding.
- (2) A person who acquires a holding in accordance with the principle of justice in transfer, from someone else entitled to the holding, is entitled to the holding.
- (3) No one is entitled to a holding except by (repeated) applications of 1 and 2 (Nozick, 1974, p. 151).

According to this entitlement theory, a distribution of property is just if everyone is entitled to his property (has come by his property by legitimate means). The state has no right to interfere if all the acquisitions are just, even if the distribution of property among the citizens would be completely unequal. The theory has two aspects: there must be justice in transfer (I have to acquire my property by recognized procedures for acquiring property), and there must have been justice of acquisition somewhere in the past (the first appropriation). With regard to first appropriation, Nozick follows Locke, although with some differences. As for Locke, the starting point for the first appropriation is the self-ownership of the individual. According to Locke, a person could become the owner of a piece of land by mixing his labor with the land. Nozick seems to follow this line of reasoning, although he does not present an argument for the transition of mixing labour with an object to entitlement of the object (O'Neill, 1981). He does not make clear how first appropriation would be possible.

The presupposition of ownership of the body is not stated in Nozick's theory as explicitly as it is in Locke's theory. Nevertheless, what can be said about what a person is allowed to do with his body, is that a person may choose to do to himself



what other persons would not be allowed to do to him without his consent. Nozick refers to Locke, and mentions that according to Locke persons are not allowed to do everything they please with themselves (e.g., suicide is forbidden). His own position, however, holds that a person may do to himself, or permit another to do to him, *anything* (emphasis, Nozick), unless he has an obligation to a *third party* to refrain from certain actions (Nozick, 1974, p.58).

The theories discussed so far all try to justify property rights to objects external to the human person (or body). If ownership of the body is mentioned, the concept functions as a presupposition from which property rights in other objects are deduced. This suggests that theories of ownership of the body are not easily derived from general philosophical theories of property. This conclusion seems not to be confined to the presented theories. Another example is Rawls' theory of justice. For Rawls, ownership is not based on a natural right, but is a result from political and legislative decisions within civil society. In his theory of justice Rawls seems to argue for a common or collective ownership of natural assets or talents. A person's talents are not his private "property", and, therefore, a person has no right to (all) the income from his talents. Each member of the community has a right to the income of these talents of an individual person (Grunebaum, 1987). According to Kernohan (1990), however, this collective ownership is not in contradiction with self-ownership, if it is interpreted as meaning that a person does not have a right to unlimited income from his talents. Collective ownership would be in contradiction with Rawls' own theory, because for Rawls, the most important principle of justice is the right of each person to the most extensive basic liberty compatible with a similar liberty for others. This right of liberty includes the right to freedom of the person along with the right to hold (personal) property.

Even Marxism with its emphasis on collective ownership of the means of production does not seem to entail a collective ownership (by the state) of persons and their bodies. An indication for this conclusion is the law on organ transplantations in the former German Democratic Republic. Based on the principle of mutual assistance, all citizens are supposed to be organ donors after their death. However, if a person has layed down during his life that he does not want his organs to be used for organ transplantation, his wish is to be respected, because of the legal right of every citizen to respect his personality (Konert *et al.*, 1990).

#### OWNERSHIP OF THE HUMAN BODY

In present-day literature, the starting point for the analysis of the relation between the human body and the concept of ownership are the property rights that are characteristic for ownership. If a per-

son is the owner of an object, this does not imply that he has only one right with regard to the object. Ownership is a complex collection of claim rights, duties, powers, and immunities. As a paradigm of ownership, reference is often made to Honoré's concept of "full individual ownership". Honoré (1961) compiled a list of standard incidents of ownership. Although the listed incidents are not individually necessary conditions for private ownership, they may, however, together be sufficient for full individual ownership. The standard incidents include: (1) the right to possess a thing; (2) the right to the exclusive use of a thing; (3) the right to manage; (4) the right to the income; (5) the right to the capital, i.e., the right to alienate (transfer) the object and the liberty to consume, waste or destroy the object; (6) immunity from expropriation; (7) the power to bequeath; (8) the absence of term; (9) the prohibition of harmful use; (10) liability to execution; and (11) residuary character. This list of incidents can be useful as a frame of reference in order to decide about different modes of ownership.

With regard to ownership of the human body, it is possible to distinguish between three positions: (1) no ownership of the body and its parts, (2) no ownership of the body but limited property rights with regard to body parts, and (3) full ownership of the body and its parts.

#### (1) *No ownership of the human body and its parts*

One way to acquire insight in the concept of the human body is to examine how we talk about our own body (Kass, 1985). Sometimes we identify ourselves with our body (he kicked me), at other times we distance ourselves from our body (he kicked my leg). The use of the possessive pronoun suggests some mode of possession. But does possession here amount to ownership? Is my body my property, or is it me? The question really is whether some of the characteristics of ownership may be coherently applied to the body. For example, can I alienate my body like I can "alienate" my book? How did I acquire "ownership" of my body? I did not labour for it, and I did nothing to deserve it. Is it a gift? How do I behave toward a gift? Can I dispose of it as I please? Looking at and interpreting features of our body, we understand that we are of necessity embodied beings. Part of our dignity consists in acknowledging our fully embodied existence. We are, moreover, not completely autonomous beings, we are part of a succession of generations. Many came before us, thanks to whom we exist; many will come after us. Our embodiment, therefore, is a gift to be cherished and respected. According to Kass (1985), some of the practices of modern medicine (reproductive technology, cosmetic surgery, organ transplantation) do not acknowledge the nature and meaning of bodily life, but have as their starting point the autonomy of the human person.

If the body is a gift that should be treated with respect, and if we are not completely autonomous beings, then selling and buying of organs, for example, would not be to recognize our bodily condition (U.S. Congress, 1987).

*(2) No full ownership of the body, but limited property rights with regard to body parts*

Authors defending this view argue that a person is not the full owner of his entire body, and that he, therefore, cannot claim a right to sell and destroy his body. The body is regarded as an integral part of the person. The authors, however, do not exclude the possibility of limited property rights with regard to body parts, because of a certain similarity between body parts and ownable objects.

Harré introduces the concept of "metaphysical ownership" to denote the internal relationship between a person and his body (Harré, 1991, pp.11–37, 116–141). A condition for being this person is that I am embodied in this body. Because of my persistent body I am aware of my individuality and identity. This is an important characteristic that separates human bodies from things. I am because of this body, without this body I would not be. Losing some of my private property will not have the same effect.

Although a person is intimately related to his body as is expressed by the concept of metaphysical ownership, is there room for legal ownership of the body, or its parts? Legal ownership, according to Harré, includes a right to dispose of one's property the way one chooses (if there are no restrictions imposed). The right of transfer is one of the rights an owner has with regard to his property. This right can be restricted, for example, if it concerns an object of aesthetic value. The legal right to dismantle or destroy it could be denied. Harré argues that the owner's right to dispose of valuable objects and the rights of persons with regard to their bodies are sufficiently similar to acknowledge that one has legal ownership with regard to some body parts. Disposal of body material in so far as it does not threaten the integrity of the body should be legally permitted. For example, the removal of hair, blood, and even one kidney will not threaten the integrity of the human body. Harré does not make clear whether he would allow the sale of all body material that falls under legal ownership, or only the sale of some body material (thus further restricting the legal rights of the owner).

In developing his theory of property, Munzer analyzes rights with regard to our bodies (Munzer, 1990, pp.37–58). His analysis also compares the rights we have with regard to things with those we have with regard to our bodies. Munzer defines "property" as relations between people with respect to things. Property is "a bundle of rights". Do per-

sons own their bodies? Assuming that the legal rights acknowledged by U.S. law are justified, then people do not own their bodies in the sense of full individual ownership, but they may have some limited property rights over their body parts. To specify the rights people have over their bodies, Munzer analyzes the elements of the "bundle of body rights". He distinguishes between personal rights and "strong" and "weak" property rights. Not all rights a person has with regard to himself are property rights, some rights fall under privacy. The criterion employed to distinguish between personal rights and property rights is *transferability*. Personal rights are rights that protect interests or choices of a person, other than the choice to transfer. For example, the right of free speech is a right that a person has and can waive, but he cannot transfer it to someone else. Property rights are body rights that protect the choice to transfer. If a person is only permitted to donate some body material, then he has a "weak" property right with regard to this body material. "Strong" property rights involve the transfer of body material in exchange for money.

According to Campbell (1992), three elements of the "property paradigm" can be found in the literature on biomedical ethics. First, a right of territorial integrity: people have a right of bodily integrity, because they are and possess their bodies. Physicians are not permitted to operate on patients without their informed consent. Second, developments in modern medicine have made it possible to separate a whole range of "parts" from the body. In addition to hair, urine, blood and sperm, tissues, (reproductive) cells and organs are now transferred between people. In terms of property: organs can be alienated (transferred) and acquired. This raises the question of control and legal possession, the third element of the property paradigm. If the body is property, who is the owner? Who has the right to possess (or exclusively control) the body? To assert that a person is the owner of his body and its parts is to acknowledge his right to control what happens to them.

However, the observation that elements of the property paradigm can be applied to rights people have with regard to their bodies (right to bodily integrity) or to procedures taking place within medicine (organ transplants), provide no justification for the restricted use of the property paradigm with regard to the human body. Analysing a religious conception (stewardship) and a secular conception (self-ownership) of ownership of the body may further clarify this issue. The analysis reveals that in both of these conceptions alienation (transfer) of body parts is possible. Within some religious traditions (Western religious traditions) even the sale of some body materials would not be morally objectionable. Campbell, however, has reservations with regard to allowing a commercial



market in organs. Safeguards must be established to prevent treating the human body as mere property, for this would be to deny our embodied existence.

A somewhat different approach is presented by Murray (1987). Recognizing the value of the body, both for ourselves and for others (organs for transplantation; tissues for research), there are at least two ways to view body parts; they may be seen as property that can be bought and sold, or they can be seen as gifts. Murray argues that at least some body parts should not be regarded as private property, but as gifts. According to him, gifts are important in establishing and maintaining moral relationships among people, because gifts create obligations for donors and recipients. Gifts to strangers (blood or organ donations) are important for relationships within society and for respecting specific human values. They underscore our interdependence and the value of solidarity and human dignity.

This does not mean that all body parts must be treated as gifts; as items that can not be bought or sold. After all, not all body parts are equally essential for human life. Murray gives the examples of urine, nails, and hair. The sale of these body materials would hardly threaten human dignity. Other body parts, however, should be regarded as gifts, due to their importance in sustaining the lives of members of the society. For Murray, some body material is fully owned (i.e., one has the right to sell the material), but other body materials are only owned in a limited sense (i.e., one has no right to sell them, only to donate them).

### *(3) Full ownership of the body*

Some authors recognize legal ownership of the human body, although restrictions on what a person will be permitted to do with his body are still possible. Andrews (1986) maintains that people's body parts are their own personal property. The reason for this acknowledgement is twofold: (1) the fact that in U.S. law the body is sometimes treated as property; (2) the "property approach" is the best way to protect the interests of people concerning their own body parts. It will enable them to control what happens to their body and its parts. According to Andrews, there is no reason to prohibit the sale of all body parts. A prohibition is justified for the donation or sale of non-generative body parts, where donation entails the death of the donor. For Andrews, allowing the sale of body parts will not necessarily lead to the public's judgement that human beings are merely commodities. A safeguard against this danger is that only persons themselves are allowed to treat their body parts as property; others do not have the right to treat me as property.

Another advocate of one's full ownership of the human body is Engelhardt (1986, pp.127-134, 365-366). The fair allocation of scarce health care

resources requires us to know what would be a morally justified allocation; to know this it is necessary to know who owns what and in what way. Engelhardt's theory of ownership follows the views of Hegel and Locke on the acquisition of ownership. For Locke, a person acquires ownership of a thing (land) by mixing his labor with it. According to Hegel, one takes possession of a thing by grasping it, forming it, and by marking it as one's own. The classic example of possession is one's "possession of oneself" (we form and use ourselves). How do we acquire ownership of things other than ourselves? Partial ownership of other persons we acquire by consent, or because we are the producers of them (our children). Ownership of things we acquire by grasping, forming, marking, and laboring on them. By these actions we extend our person in the thing and thereby bring it within the sphere of mutual respect (i.e., others may not interfere with the thing without our consent).

Apart from private ownership, there are two other forms of ownership, namely communal ownership and general ownership. Communal ownership are the resources that are brought together through a free, common endeavour of the members of a community. General ownership is the right of every person to the rough material of the earth. Only the communal resources can be allocated to health care projects by common consent. But persons with private property will always have the right to use it in the way they see fit. Physicians, for example, have the right to sell their services outside a national health care system, because they are the owners of their talents.

In this theory of ownership a person is the private owner of himself and therefore of his body, its parts, and his talents. A free individual has the right to dispose of his property (and thus himself) as he pleases. The state has no right to interfere with the transactions of free individuals. A prohibition on the sale of one's organs, therefore, would not be morally justified. It is not clear whether Engelhardt would allow the sale of organs following the removal of which would have as a consequence the death of the donor. Generally, most persons would prefer to prohibit the sale of vital organs, like the heart. However, the philosopher John Harris (1992, p. 113, 119) does not see why he should not be permitted to give, or even sell, his heart (and therefore his life) if that is what he wants to do, and he fully knows what he is doing.

### OWNERSHIP OF GENETIC MATERIAL AND GENETIC INFORMATION

The positions with regard to ownership of body materials presented above have as their main focus the possible sale of body materials (for example, organs for transplantation). With regard to genetic



material and genetic information a reason to acknowledge ownership is not so much the possibility of selling genetic material and information, but the right to prevent others from having access to one's genetic material and information.

### *The status of genetic material*

It is indisputable that the genetic material, available for research and other purposes, once belonged to the body of some person and that this person should be granted some control over what happens with his genetic material. Reasons for this control are the fact that genetic material contains genetic information, which is regarded as highly personal, and the danger of abuse of the information. The question is, however, which rights a person should have with regard to his genetic material and whether genetic material should be regarded as property.

Since genetic material can be regarded as body material, it is possible to apply the different concepts of ownership of the body to genetic material. Assuming the right of self-ownership of the body, genetic material is the property of the person from whom the material was taken. The owner is free to do with the genetic material what he likes. Since genetic material is not a vital organ, there seems no need to legally prohibit either donation or sale.

Rejecting the right of self-ownership of the whole body, but acknowledging limited property rights with regard to body parts, a decision must be made concerning genetic material. This decision will depend on the criterion used to distinguish between different forms of body material. If legal ownership of body parts is warranted as long as the integrity of the body is not in danger, genetic material may well fall under legal ownership. Acquiring genetic material does not involve complicated and invasive procedures. If the distinction between a right to sell and a right only to donate body material depends on the social value attached to the body material, it is necessary to decide whether genetic material has an important social value. If the criterion for property rights is transferability, property rights would be applicable to genetic material. The question is then whether the property rights are weak (only a right to donate) or strong (a right to sell).

Apart from the acknowledgment of ownership of the body or limited property rights with regard to body parts, it is also possible to refuse to apply the concept of property or property rights to the body and its parts. A reason for this position could be, for example, that regarding the body and its parts as property is a denial of our bodily existence. However, even in this case it has to be decided which rights a person has or needs to have with regard to his genetic material.

Therefore, only if the starting point is the self-ownership of the individual are the rights of the individual clear. A person has the right to sell or donate his material, whatever he likes. Therefore, a person can sell his genetic material to universities or industries if they want it for research purposes. However, this does not resolve immediately some of the ethical problems in individual health care. Does a right to sell one's genetic material also imply a right to sell it to one's relatives should they need the information contained in the genetic material (if you need it, you can pay for it)? Within the framework of absent property rights or limited property rights, it has to be decided what moral and legal rights an individual should have with regard to his genetic material.

The concept of ownership, therefore, is only helpful to determine the possible uses of genetic material if one takes the position that each individual person has full ownership of his or her body, and thus of his or her genetic material. But particularly this position is problematic, given the characteristics of genetic material. Such material is not specific for an individual but refers to a pedigree; similar material is shared with relatives and genes as physical entities are in fact common to all people. In this sense, it is problematic to talk of genes as parts of an individual person's body. It is the informative content of the gene which is of interest.

### *The status of genetic information*

The status of genetic information is less clear. As was mentioned, genetic material is regarded as special, because it contains genetic information. Is there no difference between genetic material and genetic information? On the level of scientific research there is hardly a distinction between genetic material and genetic information (genetic material *is* genetic information). In the context of individual health care, however, genetic information is only available once genetic material has been analysed and the results have been stored in a medical file or computer. Genetic information, as it figures in ethical and legal debates, is information that is available "on paper". Again, there are reasons to grant a person some rights with regard to his genetic information (because it is highly personal information and the dangers of stigmatization and discrimination). The concept of property, however, is more difficult to apply. Genetic information "on paper" cannot be regarded as having belonged to the body in the same way as genetic material belonged to the body. It is, therefore, not clear whether it is possible to reason by analogy from ownership or limited property rights with regard to human body parts to ownership or limited property rights with regard to recorded genetic information. With regard to information the concept of

"intellectual property" has been developed. This concept is hardly applicable to the person from whom the genetic information derived. This person did not generate new information, he did not even analyse his own genetic information.

### *Physical vs information-related ownership*

The above distinction between genetic material and information is particularly important in the context of the patent discussion. It is the genetic information found in every person that forms the primary object of the patent, not the physical gene. In order to clarify the debate on ownership of genes, the Danish Council of Ethics (1994) has introduced a distinction between physical ownership and information-related ownership. The object of ownership can be the physical substance of the gene or sometimes the cells in which it is expressed, or it can be the information contained in the structure of the gene. This distinction is combined with one that traditionally plays a role in patent discussions, *viz.* discovery versus invention. Patenting is considered impossible for the discovery of things that exist in nature. The genome is part of the natural order. The mechanisms of nature are identified through processes of discovery. No one can have the right to monopolize a discovery. Phenomena of nature should therefore not be patentable. Things are different for inventions. Invention is human construction of new elements; it is the result of human ingenuity. Inventive processes therefore can be regarded as intellectual property of scientists or institutes (Pompidou, 1995).

The Danish Council of Ethics (1994) concludes from these two distinctions that patenting on naturally occurring human genes should not be permitted. Modified synthetic genes created or invented in the laboratory on the other hand can be patented. In other words: physical ownership of invented genetic material is possible. Since the primary object of patenting is information, a similar line can be drawn for genetic information. The information content of DNA sequences, used as part of a specific method, for the manufacture of a specific product can be patented, whereas the more comprehensive information available in naturally occurring genes can not. However, this argument solves only part of the problem. It makes clear when ownership of genetic material as well as genetic information is possible for third parties, such as scientists and industries. It leaves open the question of ownership of naturally occurring genes and corresponding genetic information. It still has to be decided whether genes in natural form are the property of individuals, families or humankind. The concept of ownership in general does not allow to make a decision here; only specific ownership the-

ories will do. But specificity will at the same time reduce the applicability of the concept in moral debates focused on general guidelines and universal rules.

### CONCLUDING REMARKS

In order to clarify the status of genetic material and information we examined whether it would be possible to construct a line of reasoning from ownership of the human body to ownership of its parts, including genetic material, and, next, to ownership of genetic information. A presupposition of this argument is that the concept of ownership can be applied to the human body. An examination of some theories of property shows that it is not easy to derive a justification for the use of the concept of ownership of the human body from these general theories of property: the concept of property either is not applied to the human body or ownership of the human body is a presupposition to acquire ownership of other objects.

Another approach to the question of ownership of the human body is to examine whether the characteristics of ownership can be applied to the human body, instead of trying to find a philosophical foundation for the use of the concept of property itself. The survey of the different positions with regard to ownership of the human body shows that the concept of property is easily applicable to the human body, although none of the conceptions noticed really amounts to full individual ownership. For example, people are not legally permitted to treat each other as things (sometimes even with their consent). Nevertheless, it is clear that there is a range of possibilities with regard to ownership of the body. At one extreme there is opposition to ownership of the body and its parts, at the other there are advocates for a right to sell even one's vital organs. Between these two extremes some argue for limited property rights with regard to some body parts. Since genetic material can be regarded as body material this also applies to genetic material. Therefore, the following considerations are also valid for genetic material. The concept of self-ownership enables us to derive a right to decide the fate of one's body and its parts as one pleases. In all other cases, where the entire body is not regarded as the property of the person, legal rights with regard to one's body parts have to await thorough moral deliberation. Only after moral deliberation, it should become clear which legal rights an individual has, and if these legal rights can be classified as "property rights" or fall more properly under another rubric.

If ownership of genetic information is to make sense it probably has to be defended by arguments



other than those that refer to ownership or limited property rights with regard to the body.

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